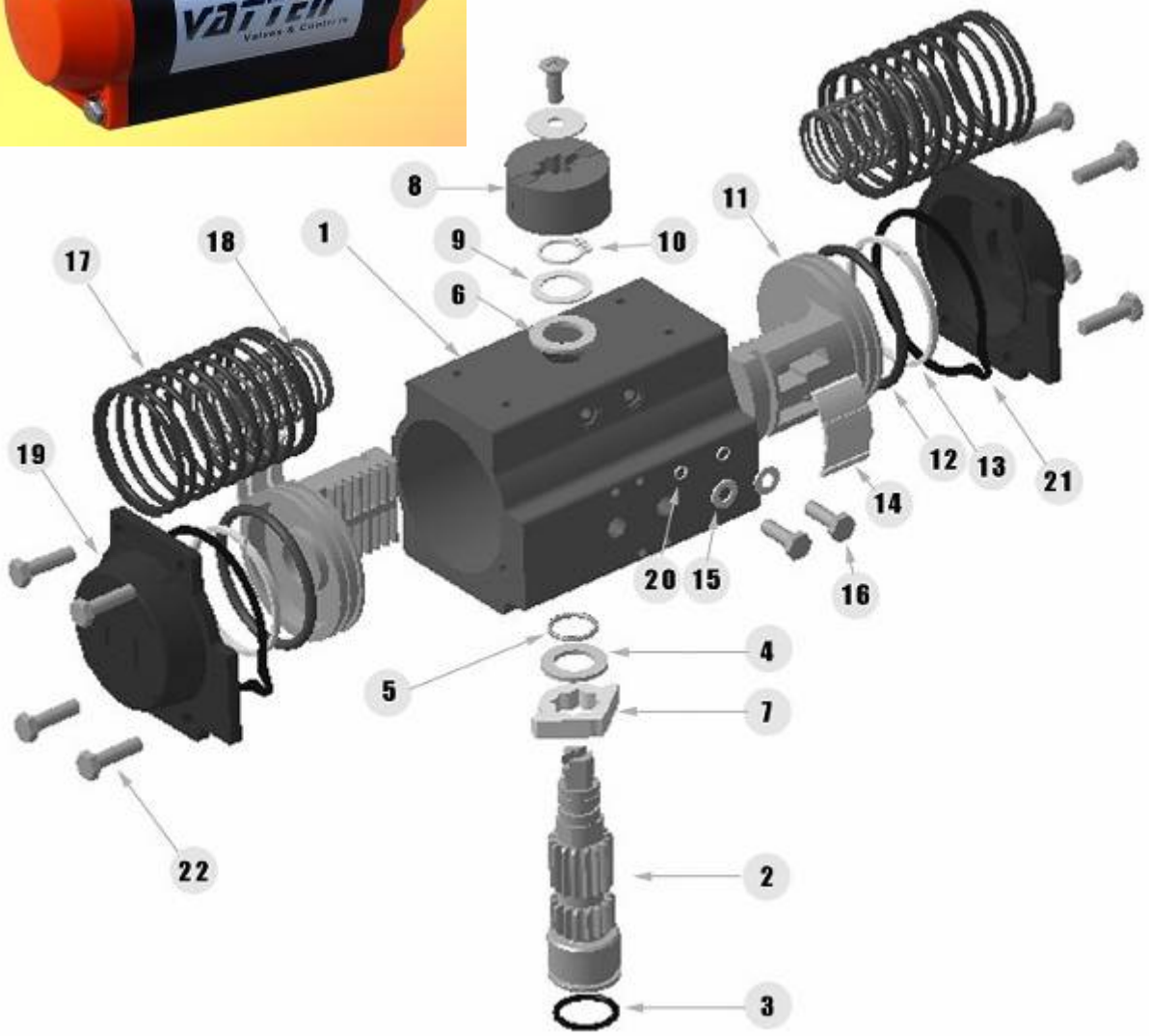
Pneumatic Actuator Parts List



PART NUMBER	DESCRIPTION
1	BODY
2	ANTI-BLOWOUT PINION
3	LOWER PINION O-RING*
4	PINION SPACER RING
5	TOP PINION O-RING
6	CAM SPACER RING*
7	STOP ADJUSTMENT
8	POSITION INDICATOR
9	PINION WASHER
10	PINION SNAP RING
11	PISTON
12	PISTON O-RING*
13	ANTI-FRICTION RING*
14	PISTON THRUST BLOCK
15	STOP BOLT WASHER
16	STOP BOLT
17	EXTERNAL SPRING
18	INTERNAL SPRING
19	END CAP
20	STOP WASHER
21	END CAP SEALS
22	END CAP BOLTS

*spring return actuators only

Parts subject to wear. Please contact the factory or your VATTEN distributor for replacement kits.

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Maintenance & Operating Instructions

VATTEN® ACTUATOR OPERATION

NOTE: For optimal operation, VATTEN actuators should be run with a supply of clean, lubricated air.

SPRING RETURN ACTUATORS

Air to PORT 2 (the right hand port) causes the actuator to turn CCW. Loss of air to PORT 2 causes air to exhaust and the actuator turns CW. This is the FAIL CLOSE operation.

DOUBLE ACTING ACTUATORS

Air to PORT 2 (the right hand port) causes the actuator to turn CCW. Air to PORT 1 (the left hand port) causes the actuator to turn CW.

DISASSEMBLING STANDARD ACTUATORS

IMPORTANT: Before beginning disassembly, ensure that the air supply to the actuator has been disconnected, all accessories have been removed and that the actuator has been dismounted from the valve.

1. Loosen the end cap fasteners (22) with a wrench (size varies depending on actuator model). On the spring return actuator, alternate 3 to 5 turns on each fastener until the springs are completely decompressed. Use caution in removing the cap since the springs are under load until the fasteners are fully extended.
2. Remove the pinion snap ring (10) with a lock ring tool. The indicator (7) may now be removed.
3. Turn the pinion shaft (2) CCW until the pistons are at the full end of travel. Disengage the pistons (11) from the pinion. (NOTE: Low pressure air--3 to 5 P.S.I. MAXIMUM--might be required to force the pistons completely from the body.) Note the position of the pistons before removing them from the actuator body. The part numbers of the pistons are located on the side and should be right-side up on an actuator with a standard orientation.
4. Remove the pinion through the bottom of the actuator. The actuator is now completely disassembled. All replacement parts may now be put in. VATTEN recommends that all wear parts (3, 4, 5, 6, 12, 13, 14) be replaced before reassembly.

REASSEMBLING STANDARD ACTUATORS

IMPORTANT: Be sure that the actuator surfaces are free of grit and scratches before reassembling.

1. Apply a light film of grease to all o-rings and the pinion before replacing.
2. Put the pinion (2) back through the actuator with the flats of the pinion shaft running parallel with the body.
3. When reassembling the actuator, make sure that the piston racks are square to the actuator body and returned to their original orientation. (NOTE: The normal operation of all VATTEN actuators is FAIL CLOSED. If you want to change the orientation to FAIL OPEN, rotate the racks 180º to create a reverse operation.
4. When replacing springs in a spring return actuator, ensure that the springs are replaced in their identical position in the end cap from which they were removed. (NOTE: In some circumstances, you might want to change the standard 80 pound spring set to fit your application and available air pressure. Changing the spring sets on VATTEN actuators requires no special tools. Please refer to the spring combination torque chart in our catalog for the inner and outer spring combinations that will allow you to operate with the spring set that you desire.
5. Seal the end caps with a petroleum lubricant and bolt to actuator body.
6. Check the seal of the actuator by covering seal areas (pinion, end caps) with soapy water and using low pressure air to the actuator to ensure that no bubbles are produced.

VA SERIES OPERATION AND SELECTION GUIDE

Double Acting Actuators

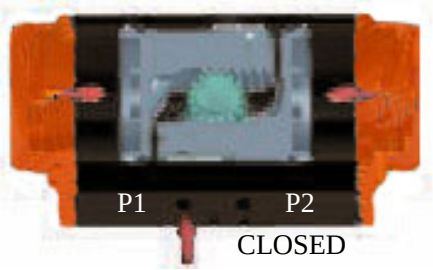
ACTUATOR OVERVIEW

- All listed output torques are expressed in inch pounds of torque (in. lbs.).
- Charts for available air pressure are expressed in pounds per square inch (P.S.I.).
- VATTEN® actuators offer ±5° adjustment in the open and closed positions on PN-52 through PN-125 models. For all other models, adjustment is in the open position only. The closed position is 0° fixed. Optional retrofit kits are available to allow for adjustment in both open and closed positions on the PN-160, PN-200 and PN-270 models.

DOUBLE ACTING ACTUATOR SIZING

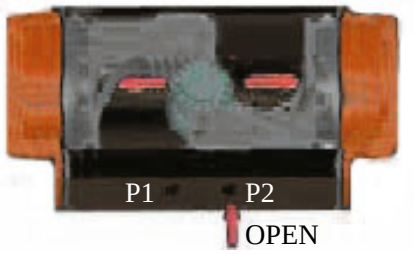
1. Establish the valve manufacturer's breakaway or seating/unseating torque, then add 20% as a safety factor (e.g. 115 in. lbs. valve breakaway torque x 20% = 138 in. lbs.).
2. Determine available air pressure to the actuator (e.g. 60 P.S.I.).
3. Refer to the chart, find the 60 P.S.I. column and scan down until a torque value greater than the valve torque is found (e.g. 141 in. lbs.). Then go to the left to determine the VATTEN® model number. In this sample case, the selected actuator would be the VA-52DA.

NOTE: The VATTEN® double acting actuator has no torque drop through the full 90º stroke.



CLOSED

Air to Port 1 (P1) forces the pistons inwards, causing the pinion to turn clockwise.



OPEN

Air to Port 2 (P2) forces the pistons outwards, causing the pinion to turn counterclockwise.

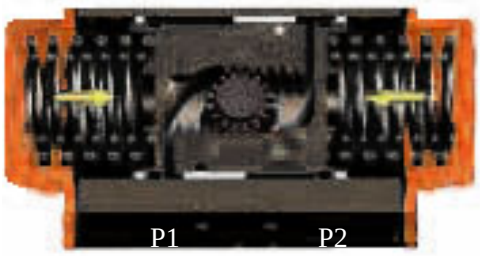
Spring Return Actuators

SPRING RETURN ACTUATOR TERMINOLOGY

1. **AIR STROKE:** When air is supplied to the actuator, the pistons compress the springs. The greater the spring compression, the less torque output the actuator can supply.
2. **SPRING STROKE:** When air is removed from the actuator, the stored energy in the springs forces the pistons inward. At full compression, the spring is at its maximum torque output. This is the **SPRING START.** When springs are uncompressed, this is the **SPRING END.**
3. **FAIL POSITION:** Standard VATTEN® actuators are preset for fail closed (CW) operation, but can be adjusted easily for fail open (CCW) rotation.

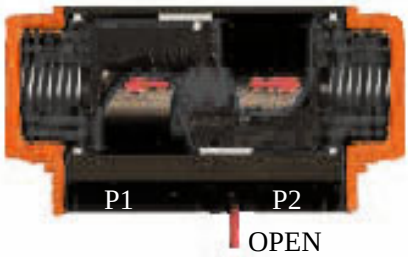
SPRING RETURN ACTUATOR SIZING

1. Establish the valve manufacturer's seating torque (closing) and breakaway torque (opening). Add a 20% safety factor (e.g. a valve torque of 80 in. lbs. x 20% = 96in. lbs.).
2. Refer to the spring torque column and select the SPRING END TORQUE that equals or exceeds the required valve torque (i.e. the VATTEN® model VA-63 with a 80# spring set, which has an spring end of 111 in. lbs. and a spring start of 196 in. lbs.).
3. Determine the available air line pressure to the actuator (e.g. 80 P.S.I.). Refer to the 80 P.S.I. column and scan down to where it intersects with the PN-63 with an 80# spring. In this case, the end spring torque is 111 in. lbs. Which exceeds the required 96 in. lbs. required?



CLOSED

Loss of air pressure on Port 2 causes springs to drive the pistons inward. The pinion turns clockwise to close while air exhausts from Port 2.



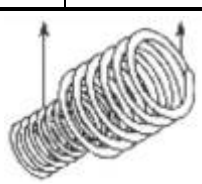
OPEN

Air to Port 2 (P2) forces the pistons outwards, causing the springs to compress. The pinion turns counterclockwise.

SPRING SET COMBINATION OPTIONS

PN-52SR TO PN-140SR

EXTERNAL SPRING	INTERNAL SPRING	AIR SUPPLY	SET #
1	1	40PSI	1
2	X	50PSI	2
1	2	60PSI	3
2	1	70PSI	4
2	2	8OPSI	5



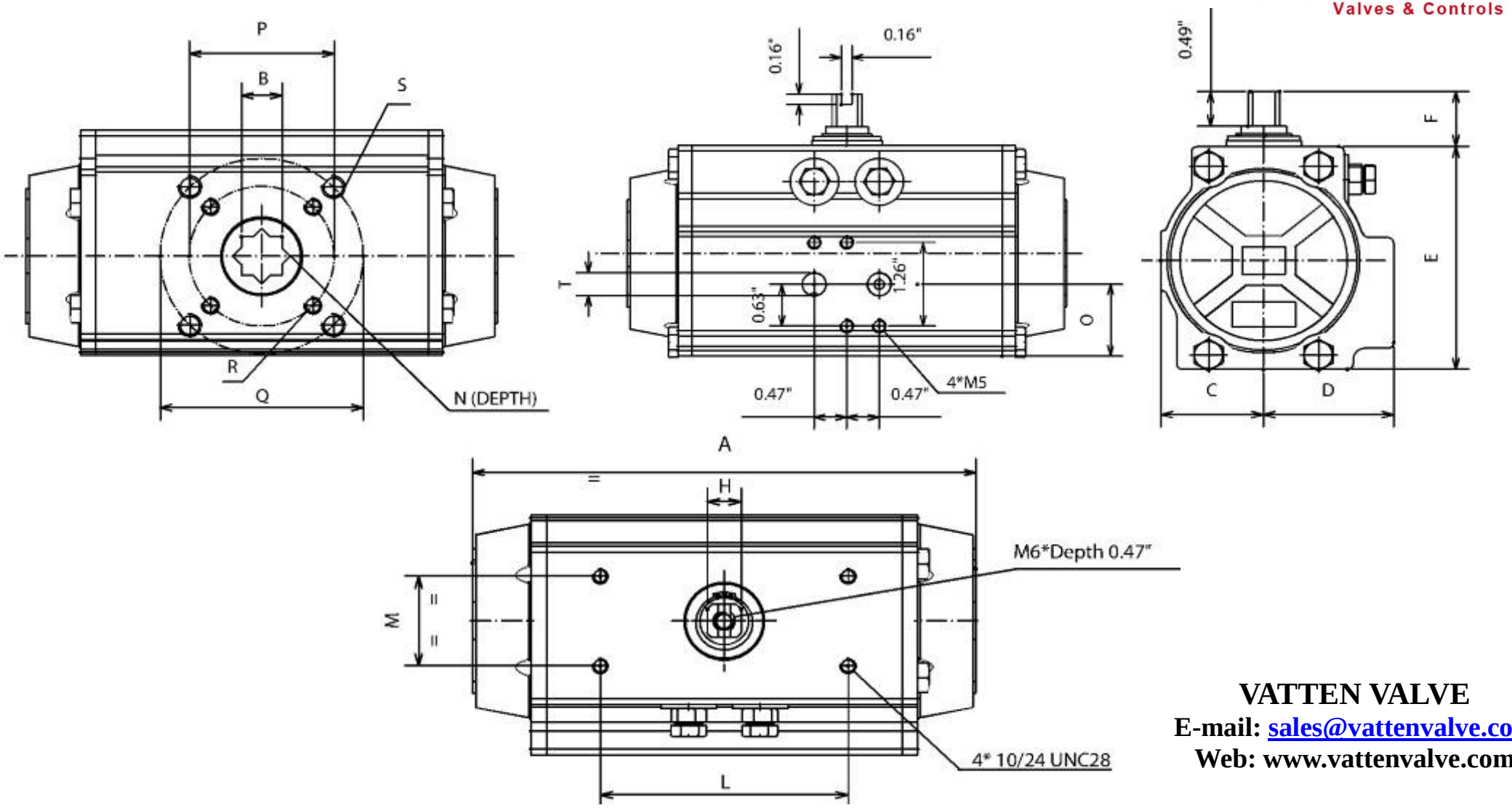
PN-160SR AND PN-200SR

EXTERNAL SPRING	CENTRAL SPRING	INTERNAL SPRING	AIR SUPPLY	SET #
X	2	X	40PSI	1
2	X	X	50PSI	2
1	2	X	60PSI	3
2	X	2	70PSI	4
2	2	X	8OPSI	5
2	2	2	100PSI	6

PN-270SR

SPRINGS PER SIDE	AIR SUPPLY	SET #
2/3	40PSI	1
3/3	50PSI	2
3/4	60PSI	3
4/4	70PSI	4
4/5	8OPSI	5
5/5	100PSI	6
5/6	110PSI	7
6/6	120PSI	8

FOR ACTUATOR MODELS 52 THROUGH 140



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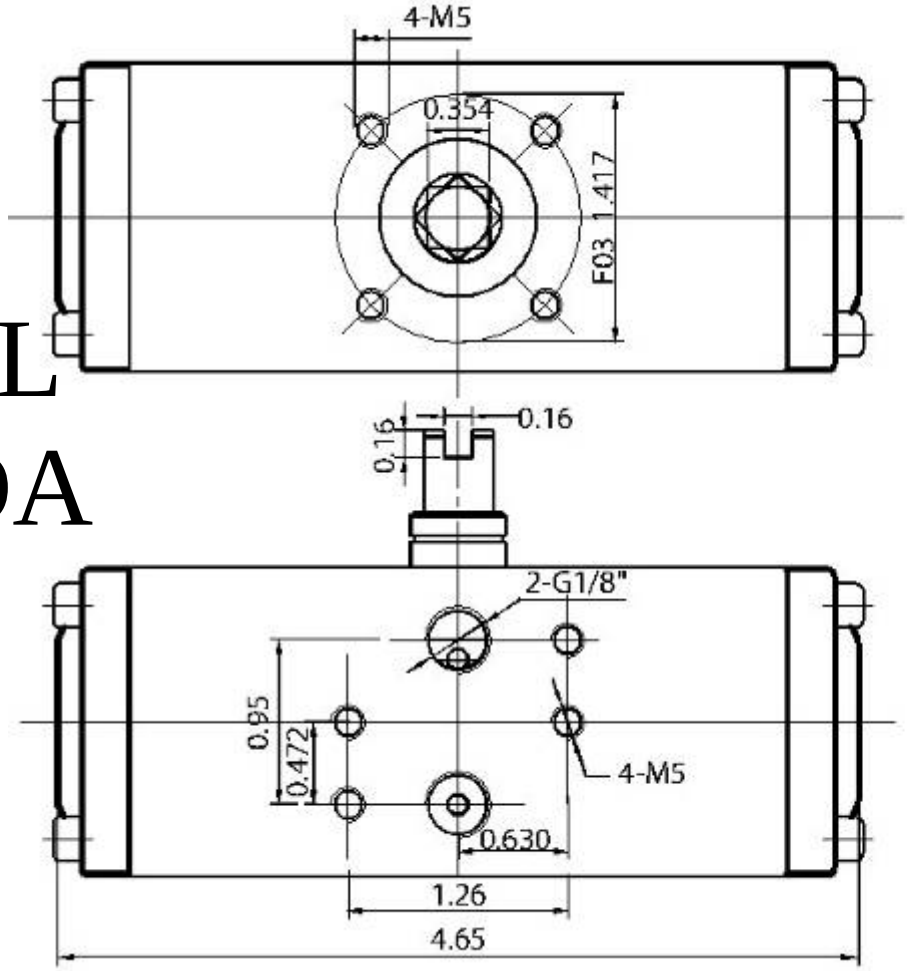
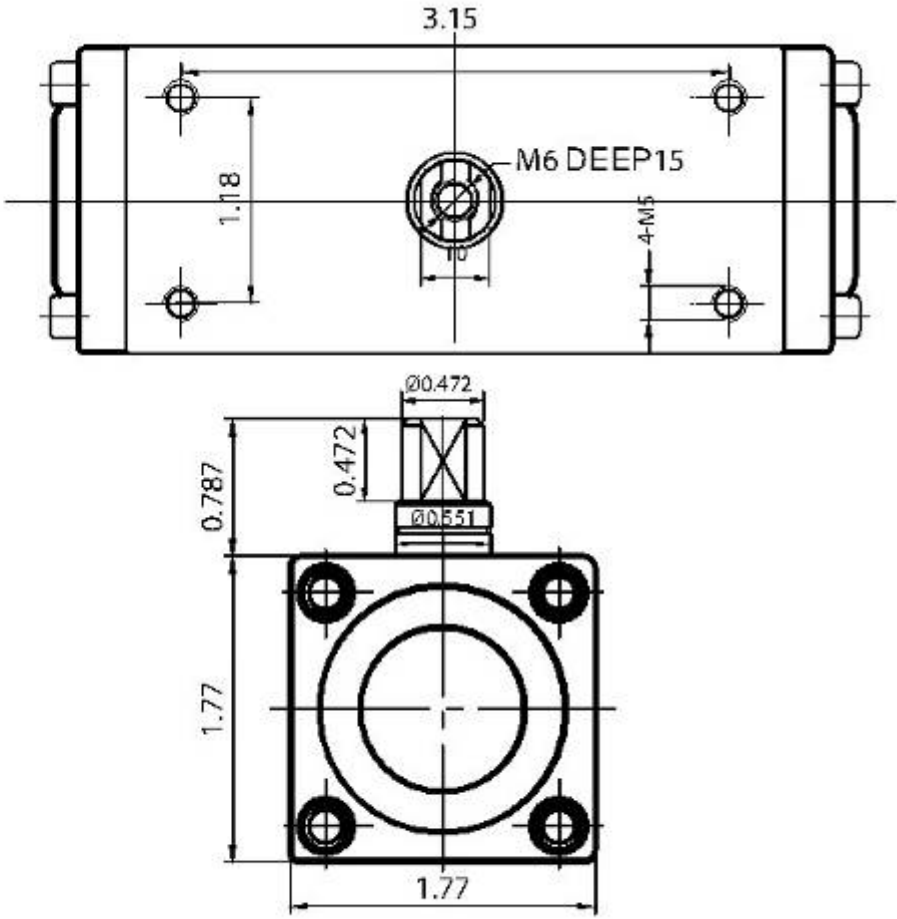
	ISO 5211	A	B	C	D	E	F	G	H	K	L	M	N	O	P	Q	R (UNC)	S (UNC)	T (NPT)
VA-52	F03/F05	5.49	0.433	1.18	1.61	2.74	0.787	3.52	0.43	0.47	3.15	1.18	0.47	1.04	1.42	1.97	10-24 X 0.29	1/4-20 X 0.35	1/8"
VA-63	F05/F07	6.38	0.551	1.40	1.77	3.17	0.787	3.96	0.43	0.59	3.15	1.18	0.63	1.08	1.97	2.76	1/4-20 X 0.31	5/16-18 X 0.47	1/8"
VA-75	F05/F07	8.15	0.669	1.65	2.07	3.82	0.787	4.61	0.67	0.75	3.15	1.18	0.75	1.38	1.97	2.76	1/4-20 X 0.31	5/16-18 X 0.47	1/8"
VA-85	F05/F07	9.35	0.669	1.87	2.30	4.27	0.787	5.06	0.67	0.87	3.15	1.18	0.75	1.65	1.97	2.76	1/4-20 X 0.31	5/16-18 X 0.47	1/8"
VA-100	F07/F10	10.69	0.669	2.17	2.68	4.78	0.787	5.57	0.67	0.87	3.15	1.18	0.81	1.97	2.76	4.02	5/16-18 x 0.47	3/8-16 x 0.55	1/4"
VA-115	F07/F10	12.91	0.869	2.52	2.87	5.57	0.787	6.75	1.06	1.26	5.12	1.18	0.94	1.97	2.76	4.02	5/16-18 x 0.47	3/8-16 x 0.59	1/4"
VA-125	F07/F10	14.41	0.869	2.68	3.15	6.04	0.787	7.22	1.06	1.26	5.12	1.18	0.94	2.40	2.76	4.02	5/16-18 x 0.47	3/8-16 x 0.59	1/4"
VA-140	F10/F12	16.85	1.060	3.01	3.44	6.93	0.787	8.11	1.06	1.38	5.12	1.18	1.14	2.80	4.02	4.92	3/8-16 x 0.59	1/2-13 x 0.71	1/4"

MODEL
VA-32DA





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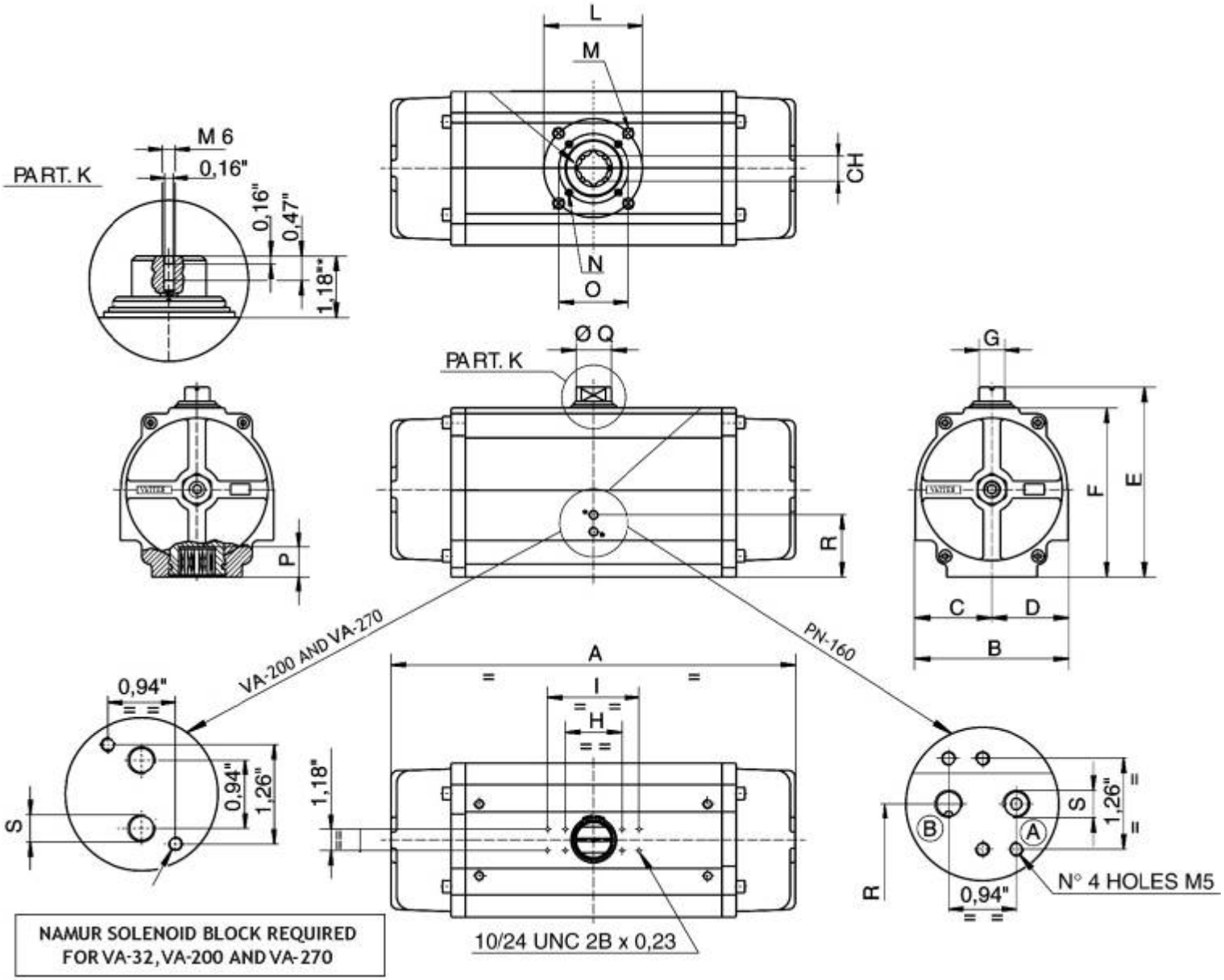
MODELS VA-160 THROUGH 270



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	ISO 5211	CH	A	B	C	D	E	F	G	H	I	L	M (un C)	N (un C)	O	P	Q	R	S (n Pt)	T	U	V	W	Z	Y	X
VA-160	F10-12	1.06	20.55	7.36	3.94	3.94	8.58	7.40	1.18	3.15	5.12	4.92	1/2-13 X 0.71	3/8-16X 0.59	4.72	1.26	1.38	3.21	1/4"	6.29	1.77	2.20	2.50	1.42	1.06	1.89
VA-200	F14	1.42	22.64	8.58	4.29	4.29	10.59	9.41	1.42	3.15	5.12	5.51	5/8-11 x 0.98	---	---	1.54	1.97	3.46	1/4"	7.48	2.03	2.52	3.11	1.90	1.41	1.52
VA-270	F16	1.81*	26.46	11.42	5.71	5.71	14.21	13.03	1.42	3.15	5.12	6.50	3/4-10 X 1.18	---	---	2.05	1.97	4.76	1/4"	9.05	2.68	3.11	4.37	2.37	1.81	3.23

***square at 45° only**